Improvements in electrolytic conduction method and apparatus for controlled material removal

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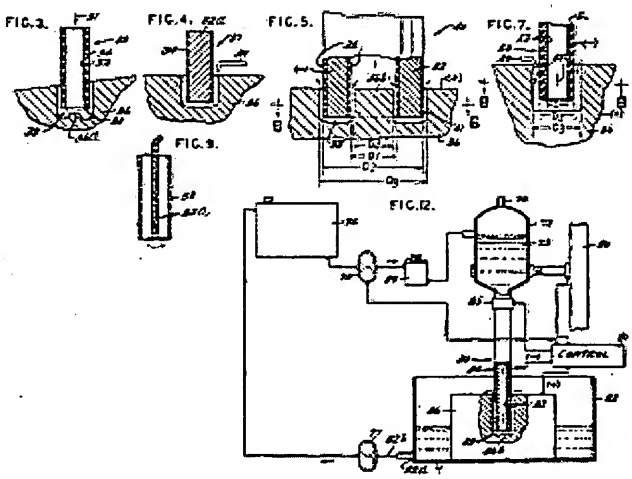
Abstract of corresponding document: **GB934557**

934,557. Electrolytically removing material. GENERAL ELECTRIC CO. May 31, 1961, No. 19644/61. Class 41. In electrolytically removing material from an electrically con- ductive workpiece, such as in pro- ducing passages of regular or irregular shapes or in contouring surfaces, the current is periodic- ally reversed in order to lessen sludge deposits in the cavity being produced, the periodical reversing being biased so that the current used for metal removal is greater than that for sludge removal. Periodically reversed D.C. or A.C. may be used and frequencies of reversal may be up to and including ultrasonics. The electrodes may be hollow and insulated at its outer surface only, Fig. 3; or be insulated at both its inner and outer surfaces, Fig. 5. Alternatively, it may be solid, Fig. 4, or may comprise a wire 52a, Fig. 9, within a non- conductive tube 53. Fig. 3 shows electrolyte supplied at 31 through electrode 30, whereas Figs. 4 and 7 show the electrolyte supplied externally at 39. Fig. 12 shows an arrange- ment where electrolyte is fed from a supply 74 to an electrode 30 via a pump 75, filter 83, reservoir 72 and flow control 85. From a work- piece 36 it is returned to the supply 74 via a tank 82 and pump 77. Movement of the elec- trode with its reservoir 72 by a motion appara- tus is controlled at 81 as is also the electrolyte flow and the current and its reversal. A guid- ance fixture, Fig. 11 (not shown), may be used whereby holes may be formed parallel or at an angle to one another. One example refers to forming holes in turbine blades. A Ti tube electrode coated with polyethylene and an



electrode comprising Ag, Pt or Au deposited within a non-conductive tube of e.g. ceramic, plastic, wood or rubber are described. Current densities are used such that sparking does not occur, e.g. 3,846 to 10,769 amps/in.<SP>2</SP>, and it is stated that by increasing pressure on the elec- trolyte or decreasing temperature the sparking point is delayed. The electrolyte may be 25% by weight aq. H 2 SO 4 .
